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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/429,295 10/28/99 BROWN

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EXAMINER

PREISCH, N

ART UNIT

PAPER NUMBER

1764
DATE MAILED:

02/26/01

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Applicati n N .

09/429,295

Applicant(s)

BROWN ET AL.

Examin r

Nadine Preisch

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazurek et al.(4,788,376) in view of Norris (5,157,201).

Applicants are claiming an oligomerization process which involves contacting a hydrocarbon feedstock containing sulfur with a hydrotreating catalyst in the absence of hydrogen. The dependent claims contain limitations directed at specific catalyst combinations and process conditions.

The reference of Mazurek et al.(4,788,376) disclose an oligomerization process. See column 1, lines 7-12. The process involves feeds including propylene. See column 2, lines 15-20. Mazurek et al.(4,788,376) teaches that it is within the scope of the invention to use "all" catalysts which are effective for the oligomerization of olefins to higher hydrocarbons. See column 4, lines 42-45. Suitable oligomerization catalysts include heterogeneous (solid)

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catalysts. See column 4, lines 48-51. The reference further teaches that "numerous catalysts are known for the conversion, e.g. oligomerization, of olefins.....other catalysts which have been employed for similar purposes include oxides of cobalt, nickel, chromium, molybdenum....on supports such as alumina. See column 4, lines 31-35. A metal supported catalyst can be combined with the oligomerization catalyst. See column 3, lines 11-20. The supported catalyst can be combined nickel and molybdenum on a support such as alumina. See column 3, lines 15-20 and 26-30.

Mazurek et al.(4,788,376) discloses process conditions including a temperature of 100-500°C (212-932°F), a pressure of 0.1 to 100 atm (1.5-1470 psig) and a WHSV of 0.2 to 20. See column 5, lines 59-67.

Mazurek et al.(4,788,376) succeeds at disclosing an oligomerization process which involves contacting a hydrocarbon feedstock with catalyst containing components corresponding to those claimed by applicants. In addition, the reference discloses overlapping process conditions. Since the reference does not disclose the use of hydrogen in the oligomerization zone, it is considered to disclose an oligomerization in the absence of hydrogen.

Several differences are noted between applicants' process and the reference of Mazurek et al.(4,788,376). The reference of Mazurek et al.(4,788,376) is silent about the feedstock containing sulfur. In addition, the reference is silent about the oligomerization of the sulfur containing molecules.

The reference of Norris (5,157,201) is cited for the general teaching that it is known in the art that higher olefin plants typically use a propylene feedstock which normally contains 5-50 ppm of various sulfur species. See column 1, lines 36-44. The reference further teaches

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that during the oligomerization, the sulfur species tend to become incorporated into the higher olefins. See column 1, lines 46-50.

Since the process of Mazurek et al.(4,788,376) involves the production of higher hydrocarbons from propylene feed, it would have been obvious to one of ordinary skill in the art at the time the invention was made to oligomerize a propylene feedstock containing sulfur impurities because the reference of Norris (5,157,201) teaches that higher olefin plants typically use propylene feedstock which normally contains 5-50 ppm of various sulfur feeds. See column 1, lines 46-51. Correspondingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to oligomerize any sulfur which may be present in propylene feed because the reference of Norris (5,157,201) teaches that it is known that sulfur which may be present in the feed is incorporated into higher olefins.

In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select any combination of metals and metal oxides in the disclosed catalyst, including applicants' NiMo/alumina or mixed NiMo or CoMo oxides, because the reference discloses that such metal/metal oxides are known to accomplish the desired conversion.

Claim Rejections - 35 USC § 103

Claims 1-5 and 8-9 rejected under 35 U.S.C. 103(a) as being unpatentable over Wilms et al. (4,098,839) in view Norris (5,157,201).

Applicants are claiming an oligomerization process which involves contacting a hydrocarbon feedstock containing sulfur with a hydrotreating catalyst in the absence of

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hydrogen. The dependent claims contain limitations directed at specific catalyst combinations and process conditions.

The reference of Wilms et al. (4,098,839) discloses a process for the oligomerization of unsaturated hydrocarbons including olefins with 2 to 5 carbons (C3 olefin = propylene). See column 1, lines 6-11. The process involves contacting a catalyst with the feed under conditions including 80 – 180° C (176-358° F), a pressure of 200-1500 psig and a weight hourly space velocity (WHSV) of 0.8 to 2.5. See column 3, lines 42-45. Wilms et al. (4,098,839) discloses a catalyst containing an alumina support, molybdenum and one or more members from the group including cobalt and nickel. See column 2, lines 35-40 and 45-50. Wilms et al. (4,098,839) teaches that the catalyst composite is catalytically activated in an oxidizing atmosphere such as air or oxygen. See column 2, lines 60-65. The reference further teaches that the metals in the catalyst are converted to the oxide form. See column 3, lines 1-10. The reference discloses a specific example with cobalt oxide (CoO) and molybdenum oxide (MoO₃) on alumina. See column 4, lines 6-9. The catalysts can be used in a "liquid" phase process. See column 3, lines 53-54.

The reference of Wilms et al. (4,098,839) succeeds at disclosing a process for oligomerizing a hydrocarbon feedstock with a catalyst corresponding to applicants' mixed oxide catalyst, including an embodiment with mixed cobalt and molybdenum oxide on alumina. Since the reference does not disclose the use of hydrogen in the oligomerization reaction zone, it is considered to disclose an oligomerization in the absence of hydrogen.

Several differences are noted between applicants' process and the reference of Mazurek et al. (4,788,376). The reference of Wilms et al. (4,098,839) is silent about the feedstock

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containing sulfur. In addition, the reference is silent about the oligomerization of sulfur containing molecules.

The reference of Norris (5,157,201) is cited for the general teaching that it is known in the art that higher olefin plants typically use a propylene feedstock which normally contains 5-50 ppm of various sulfur species. See column 1, lines 36-44. The reference further teaches that during the oligomerization, the sulfur species tend to become incorporated into the higher olefins. See column 1, lines 46-50.

Since the process of Wilms et al.(4,098,839) involves the use of a propylene feed, it would have been obvious to one of ordinary skill in the art at the time the invention was made to oligomerize a propylene feedstock containing sulfur impurities because the reference of Norris (5,157,201) teaches that higher olefin plants typically use propylene feedstock which normally contains 5-50 ppm of various sulfur feeds. Correspondingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to oligomerize any sulfur which may be present in propylene feed because the reference of Norris (5,157,201) teaches that it is known that sulfur which may be present in the feed is incorporated into higher olefins.

Response to Arguments

Applicants' arguments filed 11-15-00 in paper no.7 are persuasive in overcoming the rejections of claims 1, 2, 6 and 7 under 35 USC 102(b) over Barnett et al.(4,628,138), claim 3 under 35 USC 102(b) or 103(a) over Hepp (2,558,137) and claims 2 and 10 under 35 USC 103(a) over Suggitt et al.(3,717,586).

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Applicants' arguments with respect to Wilms (4,098,839) are addressed in the modified rejection above.

Prior Art of Record

The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The reference of Hammershaimb et al.(4,835,331) is cited to show that the presence of hydrogen in oligomerization reactions is known to control the length of the oligomer (column 6, lines 55-60).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nadine Preisch whose telephone number is 703-305-2667. The examiner can normally be reached on Monday through Thursday from 7:30 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode can be reached on 703-308-4311. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3599 for regular communications and 703-305-5408 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0661.

N.P.

February 15, 2001

NP

**NADINE PREISCH
ART UNIT 1764**

Nadine Preisch